

REMARKS

Applicants request favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

To place the application in better form, Applicants submit herewith a substitute specification, which includes a new abstract. For the Examiner's convenience, also provided is a marked-up copy of the original specification showing the portions thereof which are being changed. The substitute specification includes the same changes as are indicated in the marked-up copy. Applicants' undersigned attorney has reviewed the substitute specification and submits that the substitute specification contains no new matter.

Claims 1-5, 7-11, 13-22, 24-27 and 29-41 are presented for consideration. Claims 1, 17, 18, 33, 34, 37, 38 and 41 are independent. Claims 6, 12, 23 and 28 has been canceled without prejudice or disclaimer. Claims 1, 7, 8, 13, 17, 18 24, 29, 33, 34 and 36-40 have been amended to clarify features of the subject invention, while claim 41 has been added to recite additional features of the subject invention. Support for these changes and this claim can be found in the original application, as filed. Therefore, no new matter has been added.

Applicants request favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 1-40 were rejected under various statutory bases as being unpatentable over U.S. Patent No. 5,433,785 to Saito, taken alone, or in combination with U.S. Patent No. 6,487,472 to Song et al. Applicants submit that the cited art, whether taken individually or in combination, does not teach many features of the present invention as previously recited in claims 1-40. Therefore, these rejections are respectfully traversed. Nevertheless,

Applicants submit that independent claims 1, 17, 18, 33, 34, 37 and 38, amplify the distinctions between the present invention and the cited art.

In one aspect of the invention, independent claim 1 recites a stocker that includes a first sealing member for stocking an object to be stocked, atmosphere control means for controlling an internal atmosphere of the first sealing member to a first atmosphere of an inert gas, and transfer means for transporting an object to be stocked to an exposure apparatus using an F₂ excimer laser or receiving the object to be stocked from the exposure apparatus while the object to be stocked is shielded from an external atmosphere of the first sealing member.

In another aspect of the invention, independent claim 17 recites an exposure apparatus that includes a stocker. The stocker includes those features discussed above with respect to independent claim 1.

In still another aspect of the invention, independent claim 18 recites a stocker that includes a first sealing member, first atmosphere control means for controlling an internal atmosphere of the first sealing member to a first atmosphere of an inert gas, second atmosphere control means for controlling an internal atmosphere of a second sealing member to a second atmosphere of an inert gas, wherein the second sealing member stores at least one object to be stocked and is stocked in the first sealing member, and transport means for transporting the second sealing member storing the at least one object to be stocked to an exposure apparatus using an F₂ excimer laser or receiving the second sealing member storing the at least one object to be stocked from the exposure apparatus while the second sealing member is shielded from an external atmosphere of the first sealing member.

In still other aspects of the invention, independent claim 33 recites aspects of an exposure apparatus, independent claim 34 recites aspects of a semiconductor device manufacturing method, independent claim 37 recites aspects of a semiconductor manufacturing factory, and independent claim 38 recites aspects of a maintenance method for an exposure apparatus installed in a semiconductor manufacturing factory. These claims recite, among other features, features of the invention similar to those mentioned above with respect to independent claim 18.

Generally speaking, the present invention relates to exposure apparatus and methods using an F₂ excimer laser. The F₂ excimer laser is easily absorbed by oxygen. Therefore, in an exposure apparatus using an F₂ excimer laser, there is a problem that arises in that the F₂ excimer laser beam is absorbed by oxygen flowing into the exposure apparatus when an object (such as a reticle or wafer) is transported to and/or from the exposure apparatus. As a result, this decreases the yield of the exposure apparatus. In order to overcome such drawbacks, the present invention provides the ability to prevent flow of an external atmosphere, including oxygen, into the exposure apparatus.

In a first aspect and regarding the present invention recited in independent claims 1 and 17, for example, an internal atmosphere of a sealing member (for example, a first sealing member), for stocking an object to be stocked, is shielded from an inert gas so that the object can be transferred to and/or from the exposure apparatus while the object is shielded from an external atmosphere of the sealing member. According to the present invention recited in these claims, oxygen included in the external atmosphere does not substantially flow into the sealing member storing the object. Thereby, the present

invention can prevent a decrease in the efficiency of the F₂ excimer laser, which would otherwise be caused by the F₂ excimer laser beam being absorbed by the oxygen.

In a second aspect, the present invention recited in independent claims 18, 33, 34, 37 and 38 provides an additional feature of being able to control an internal atmosphere of a sealing member (for example, a second sealing member) stocked in another sealing member (for example, the first sealing member) to a second atmosphere of an inert gas, and to transfer the second sealing member storing an object to be stocked to and/or from an exposure apparatus, while the second sealing member is shielded from an external atmosphere of the first sealing member. In this manner, an object to be stocked can be stocked air tightly with a double layer of the seal members. This arrangement can, therefore, significantly prevent any decrease in the efficiency of the F₂ excimer laser, for reasons similar to those noted above.

Applicants submit that the cited art does not teach or suggest such features of the present invention as recited in the independent claims.

The Saito patent discloses a CVD apparatus for controlling the density of oxygen from dropping below a predetermined level in a load-lock chamber of the CVD apparatus in order to suppress formation of a native oxide film on the surface of a semiconductor substrate, such as a wafer. In that patent, wafer cassettes 9 carrying a wafer 11, are introduced into a cassette chamber 1. The cassette chamber 1 is evacuated by a cassette chamber pump 10 to prevent ambient air from entering a load-lock chamber 5. The Saito patent, however, discloses an exposure apparatus that uses a KrF excimer laser, instead of an F₂ excimer laser, in the manner of the present invention recited in the independent claims.

The Song et al. patent discloses a monitoring system for monitoring operation states of various fabrication systems by using a diagnostic system.

In contrast to the cited art as discussed above, the present invention is directed to exposure apparatus and methods using an F₂ excimer laser, instead of a laser that is not absorbed by oxygen, such as a KrF excimer laser. Therefore, the present invention seeks to overcome drawbacks associated with exposure arrangements using F₂ excimer lasers. The cited art, however, does not teach or suggest anything related to the advantages provided by the present invention when using F₂ excimer lasers in exposure apparatus and methods. Applicants submit, therefore, that the cited art does not teach or suggest the salient features of the first aspect of the present invention, discussed above.

Still further, the Saito patent does not discuss that the wafer cassettes 9 are air tightly sealed as in a double sealing arrangement, which includes first and second sealing members, in the manner of the present invention recited in independent claims 18, 33, 34, 37 and 38. Likewise, the Song et al. patent does not teach or suggest such features. Therefore, the cited art likewise does not teach or suggest the salient features of the second aspect of the present invention, discussed above.


For the foregoing reasons, Applicant submits that the present invention, as recited in independent claims 1, 17, 18, 33, 34, 37, 38 and 41, is patentably defined over the cited art.

The dependent claims also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicants further submit that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Steven E. Warner", is written over a horizontal line.

Attorney for Applicants
Steven E. Warner
Registration No. 33,326

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

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